DR-38. STRUCTURE AND ANTIOXIDATIVE PROPERTIES OF WATER-SOLUBLE MAILLARD REACTION PRODUCTS FORMED IN DRIED ETHANOL

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Maillard reactions generally lead to the formation of numerous compounds with varied structures, among these some sugar degradation products showing reducing properties are of special interest. Products of the Maillard reaction can prevent oxidative degradation and they act as stabilizing agents in several foods [1]. Synthetic techniques for Maillard product's preparation are almost due to aqueous media and non-solvent conditions; non-aqueous or mixed are described in a limited amount of papers [2, 3]. Our earlier investigations show ethanolic and aqueous-ethanolic solutions perspective for preparation of non-dialyzable products with antioxidative properties, as well as dialysate's characteristics were not been investigated in detail. In this regard the aim of study presented is investigation of structural characteristics and antioxidant properties of water-soluble fractions of Maillard reaction products, formed in dried ethanol as reaction media. Model *D*-glucose-*p*-toluidine system was thermostatting (70 °C) in dried ethanol with minimal quantity of acid catalyzer during 1 hour, isolated solid product was fractioned by water, soluble fraction (light yellow color) was dialyzed and antioxidative activity of dialysates was measured. Spectral characteristics for structure investigation were carried out by derivative FT-IR and mass-spectroscopy. Based on previous studies we assumed the accelerated influence of dried ethanol on amino-carbonyl interactions [4] and formation through elimination of *p*-toluidine from Amadori compound besides 3-deoxyhexo-1,2-diuloses (3-deoxyosones) [3] also 1-deoxyhexo-2,3-diuloses (1-deoxyosones) [2] as side reaction. First of reductones condensed to form insoluble brown products, second reductone type previously undergoes to low molecular mass dialyzable water-soluble products. Low acidity of reaction media explains the possibility of more reactive 1-deoxyosones formation, which can rapidly produce chromophores by the cyclization and cleavage-condensation processes [1]. Second derivative FTIR spectra demonstrate in region of double bonds several bands, some of them (1570, 1635, 1618 cm^{-1}) assigned to stretching vibrations of C = C and C = O functions in six-member cyclic structure units, another peaks (1600, 1683 cm^{-1}) attributed to 3-furanone derivatives [1]. In mass-spectra intensive signals m/z 106 and 107, characteristics for *p*-toluidine were registered, that illustrates aryl amine elimination from Amadori compounds in non-transformed form [2, 3]. Unsaturated structural fragments assumed high reductive activity and corresponding antioxidant properties of water-soluble dialyzed Maillard products, which were measured in compare with free from Maillard products samples. Inhibition degree values show significant antioxidative activity of primary fractioned dialyzed solution, but not of isolated solid products, dissolved for antioxidant properties estimation, probably because of reductones and its derivatives liability to oxidation and condensation reaction.

References

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